The concept of occupancy and the occupancy principle have been applied to studies of the kinetics of a wide variety of metabolic problems. These include iodine, thyroid hormones, calcium absorption and accretion, iron, bromine, trace elements, and radiation dose from ingested isotopes. This application to pharmacology forms a junction between one of the diverse developments stemming from the occupancy principle and the successful application of pharmacokinetics to the analysis and solution of problems in pharmacotherapeutics.

Requests for reprints should be addressed to J. S. O.

REFERENCES


**ARTERIAL BLOOD GASES AFTER ATROPISE SULPHATE IN HEALTHY VOLUNTEERS**

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**Summary**

The effects of atropine 0.6 mg, intravenously administered to ten healthy volunteers in recumbent position, on arterial pH, $P_{O_2}$, and $P_{CO_2}$ were determined; there were no significant alterations of blood gas values after atropine administration. There seems to be no contraindication to the use of atropine sulphate for premedication in terms of its effect upon arterial blood-gases, in patients with normal cardiorespiratory function.

**Introduction**

In 1964, Tomlin et al. reported a finding that would potentially limit the use of atropine. They presented data which showed a fall in $P_{O_2}$ after intramuscular atropine.

We have evaluated the effects of intravenous atropine sulphate on arterial blood gases in healthy volunteers.

**Method**

The nine volunteers were healthy adult students between the ages of 21 and 29 (mean 25). They ranged in height from 64 to 73.5 in. with a mean of 69 in., and weighed from 115 to 210 lb. (mean 154 lb.). Three were female. All consented to the administration of atropine and to arterial puncture. The volunteers were recumbent during the tests. Blood-samples were obtained via an indwelling Riley needle inserted into the left brachial artery. $P_{O_2}$ was determined polarographically, using a Radiometer-Clark electrode. pH was determined using a Radiometer glass electrode. pH was determined using a Radiometer glass electrode. pH was determined using a Radiometer glass electrode.
MEAN (± S.D.) PaO₂, PCO₂, AND pH IN HEALTHY VOLUNTEERS GIVEN 0·6 mg. ATROPINE

<table>
<thead>
<tr>
<th></th>
<th>Control values</th>
<th>Post-atropine values at (min.):</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>PaO₂ (mm. Hg)</td>
<td>93·3±0·9</td>
<td>93·2±0·6</td>
</tr>
<tr>
<td></td>
<td>(±0·4·9)</td>
<td>(±0·5·16)</td>
</tr>
<tr>
<td>PaCO₂ (mm. Hg)</td>
<td>35·5±3·54</td>
<td>36·2±3·26</td>
</tr>
<tr>
<td>pH</td>
<td>7·40±0·018</td>
<td>7·40±0·021</td>
</tr>
</tbody>
</table>

*Results for eight volunteers only; one sample was contaminated.

electrode with carbon-dioxide tensions being interpolated by the Siggaard Anderson method.

Lead II of the electrocardiograph was monitored during the procedure in eight volunteers.

After insertion of the intra-arterial needle and the start of an intravenous infusion of 5% glucose and 0·2% sodium chloride a period of rest was allowed. Two arterial samples were then drawn at 10-minute intervals.

Atropine sulphate 0·6 mg. was given intravenously in a volume of 20 ml. and over a period of 2 minutes, and blood-samples were drawn at intervals of 5, 15, 30, 45, and 60 minutes. Volunteers were then asked to take a maximum inspiration three times during a 1-minute period. 5 minutes later, a final arterial sample was drawn.

Results

PaO₂ levels did not change significantly at any time during the monitoring period, and PaCO₂ levels remained within physiological limits throughout the test (see figure and table). Variations in pH were not significant (see table).

There were no arrhythmias associated with atropine administration in any volunteer. Pulse-rate ranged from a mean of 85 just before administration of the drug to a mean of 103 afterwards; these changes were not felt to be of clinical significance.

Discussion

In attempting to reconcile our results with those of Tomlin et al.¹ some comments on their study should be made:

(1) We used healthy volunteers while Tomlin et al. investigated patients preoperatively.

(2) Tomlin et al. took no control samples before administration of atropine, so they did not, in fact, demonstrate a fall in PaO₂ in any patient after the drug. All they did demonstrate was a difference in PaO₂ between two groups of patients immediately before induction of general anesthesia; one group having received atropine.

(3) Three of their control patients had PaO₂ levels above 102 mm. Hg, one being as high as 111·9 mm. Hg. These are somewhat difficult to reconcile in a patient breathing room air.

Our results are corroborated by Daly et al.² who found no fall in PaO₂ in healthy volunteers after intramuscular administration of atropine sulphate.

Atropine sulphate given intravenously does not seem to produce changes in blood gases in healthy volunteers. We conclude that no contraindication to atropine as an adjunct to premedication exists in so far as its effect on arterial oxygenation is concerned. Additional studies in patients with cardiopulmonary problems are needed.

We thank Carol Haack and Nancy Bassett for their help in this work.

Requests for reprints should be addressed to J. S. F.

REFERENCES

2. Daly, W. J., Ross, J. C., Behnke, R. H. J. clin. Invest. 1963, 42, 1083

Preliminary Communications

RECOVERY OF RESISTANCE (R) FACTORS FROM A DRUG-FREE COMMUNITY

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Summary A study of an antibiotic virgin population in the Solomon Islands showed that R factors can be recovered at low frequency under natural conditions without the selective force of antimicrobial drugs. These R factors were recovered from soil and stool specimens, mediated resistance to streptomycin and tetracycline, and, like certain R factors recovered in the United States, inactivated streptomycin by phosphorylation.

INTRODUCTION

Despite the worldwide distribution of resistance (R) factors, the origin of these episomes remains